

TITLE OF INVENTION

Car Stereo with Driver Warning System

**STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR
DEVELOPMENT**

N/A

**INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A
COMPACT DISC.**

N/A

REFERENCE TO A MICROFICHE APPENDIX

N/A

BACKGROUND OF THE INVENTION

(1) Field of Invention.

The present invention relates to a Car Stereo with Driver Warning System. More specifically, it combines a typical car stereo with a radar detector of the type that is used for detecting police radar of the sort used in radar speed traps on public roads. When the police radar is detected, the stereo volume is muted and an audible warning sound is emitted from the vehicle's speakers.

(2) Description of related Art including information declared under 37 CFR 1.97 and 1.98.

Typical radar detectors are effective and function properly if the manufacturers instructions are followed. However, there are many drawbacks associated with the use of typical radar detectors. This invention eliminates those associated problems in a convenient, practical, and relatively inexpensive manner.

The bulkiness of conventional radar detectors may be a hindrance to vision, or it may be otherwise undesirable from an esthetic point of view. Also, if a conventional radar detector is left in the vehicle unattended, its obviousness makes it vulnerable to theft. Furthermore, the theft of a radar detector usually results in vandalism to the vehicle.

Of course to reduce the chance of theft, the vehicle's operator can install the radar detector before each trip, then remove and store it after the trip is complete, but this is time consuming and cumbersome.

From a more scientific point of view, microwave frequencies of those used in police radars travel in a straight line. These microwave frequencies will pass through many plastic materials and glass, but will not pass through metal objects or mirrors. Therefore, in order for a radar detector to function properly, the microwave radar transmission must have a favorable path from its transmitter to the receiver.

In the present invention, the radar detector portion of the Car Stereo with Driver Warning System receives signals from the vehicle's antenna. This configuration vastly

improves the signal reception ability compared to conventional horn or microstrip antennas associated with conventional radar detector units. The present invention also provides for an additional auxiliary antenna that is attached to the vehicle's grille, further enhancing its signal reception ability.

When a police radar signal is detected, the Car Stereo with Driver Warning System can respond in a variety of ways, depending on how the operator has it configured. The most common response scenario when a police radar signal is detected is the stereo volume is immediately muted, a warning tone momentarily emanates from the vehicle's speakers and a small, built-in speaker located on the control panel, and a momentary visual alert is displayed on the control panel. After several seconds, the stereo resumes its normal operation. The ability of the stereo to immediately mute and emit a momentary warning tone from the vehicle's speakers, the visual alerts on the control panel, and the enhanced radar reception capability, are key elements of the present invention.

In short, incorporating the radar detector into a car stereo system reduces the potential for theft and its associated vandalism, increases the radar detector's effectiveness, and eliminates the need for a nuisance power cord.

It is imperative to note that radar detectors are not intended to encourage the vehicle's operator to drive faster than the posted speed limit. Radar detectors, when used responsibly, actually make drivers more cognizant of their speed, warn drivers of roadwork construction sites, and produce a feeling of safety and confidence when driving in unfamiliar territory. The present invention is also not intended to encourage the driving of vehicles while playing the stereo in a very loud manner. The present invention is also not a police radar jamming system, as these are illegal in many states.

Many people own radar detectors. However, their frequency of usage has a tendency to fade with time. The reason is because most radar detectors require the operator to plug the power cord into the cigarette lighter, and then mount the unit on the visor, windshield, or dashboard. This is time consuming and frustrating, especially during cold weather conditions. Furthermore, mounting the unit on the dashboard with Velcro

™ is usually permanent, as removing the Velcro ™ pad may permanently scar the dashboard surface.

Another common complaint related to conventional radar detectors is that the power cord is unsightly, reduces visibility, and is a distraction.

Of course to reduce the threat of theft, a person can remove and store the radar detector out of view. However, removing the radar detector requires unplugging the power cord, returning the cigarette lighter to its housing, removing the radar detector from its mount, then storing it in a secure place such as the truck or glove compartment.

Conventional radar detectors have other disadvantages. Another drawback is the possibility the audio alert will not be heard over a very loud stereo. When this occurs, the entire use of the radar detector has been negated.

Another drawback is that it is sometimes difficult to mount the detector unit in a convenient place that also provides for good microwave radar reception. Because police radar guns work on the line-of-sight principle, it is necessary to provide for a clear, unimpeded path between the radar detector and the radar emitter. A radar detector that does not have the opportunity to detect the police radar is valueless. The present invention solves the above noted problems associated with conventional radar detector configurations.

Incorporating the radar detector into a conventional car stereo system and providing for integrated circuitry to interface with the stereo portion, and providing a means to utilize the vehicle's radio antenna, and providing for additional auxiliary antenna, has many advantages. This configuration reduces the possibility of theft by making the radar detector less obvious. It also makes the radar detector more effective by vastly improving its signal reception capabilities by utilizing the vehicle's radio antenna and providing for an auxiliary antenna that is mounted on the vehicle's grille. It also ensures that the driver is adequately alerted to the presence of police radar guns by momentarily muting the stereo sound, and producing a visual alert on the control panel. This configuration is also much more convenient and esthetically pleasing than conventional

radar detectors because there is no need to mount the detector, which in turn eliminates the disadvantage of having a power cord dangling in the vehicle's cabin. Thusly, drivers are more inclined to utilize the radar detector because of its convenience and ease of use.

With respect to specific prior art, some radar detector models provide for a remote antenna to be located in the vehicle's engine compartment. These models provide for unobstructed exposure to the radar emitters, but again the detectors bulkiness and associated annoying power cord are a disadvantage.

U.S. Patent 4,625,210 to Sagl is a portable radar detector that is attachable and detachable to the rearview mirror. This invention provides for unobstructed exposure to front and rear microwave frequency radar transmissions.

Several other attempts have been made to improve radar detectors. U.S patent 4,631,542 to Grimsley eliminates annoying prolonged audible alerts.

U.S. patent 4,887,086 to Unser et al is portable device that combines a radar detector with a typical citizen band radio and scanning receiver. Under the control of a microprocessor, a detected traffic radar signal will temporarily override the signal being heard unless the operator elects otherwise.

U.S. patent 4,906,999 to Harrah et al is device that detects the proximity of certain aircraft. This invention useful in determining whether an aircraft may be engaged in speed detection operations.

U.S. patent 5,220,685 to Bradt et al is a device that mutes out unwanted messages being received by a radio communication receiver. The operator must select a push button to mute the wanted sound, but the voice or code conversion will automatically reset after a set amount of time.

U.S. patent 5,250,951 to Valentine et al is a police radar detector that is capable of detecting multiple radars and determining the direction from which the signal originated.

U.S. patent 6,078,279 to Oliva is a typical radar detector that provides a muting means, and more particularly, to a signal detector which initiates a muted alarm upon detection of a second, subsequent signal.

U.S. patent 6,118,403 to Lang and U.S. patent 6,201,493 to Silverman are radar detectors that combine GPS and networking capabilities so radar detectors can communicate, form a data base, and subsequently alert others that are on the network.

Several U.S. patents have been granted relating to improvements to car stereo lighting and control/display features. These include U.S. Patent 5,363,122 to Suenoga which relates to a System For Controlling A Display On A Car Stereo, and U.S. Patent 6,065,868 to Kintz, which relates to a Temperature Display For A Car Stereo.

None of the above mentioned inventions combine a typical car stereo with radar detection capabilities, consequently they do not meet the objectives of the present invention outlined below.

BRIEF SUMMARY OF THE INVENTION

Summarized briefly, the principle object of the present invention is to combine a modern means of detecting highway speed control radar emitters with a typical car stereo system. This combination is known as the Car Stereo with Driver Warning System.

The Car Stereo with Driver Warning System is comprised of a housing adapted for mounting into or under the dashboard of a motor vehicle. The stereo portion consists of an amplifier provided within the housing for receiving, generating, and amplifying audio signals of at least one of an AM/FM tuner, tape player, or compact disk player. The radar detector portion is comprised of a typical police radar detecting means for detecting the presence of radar signals. The radar detector portion is electrically integrated into the stereo amplifier portion with electronic interface logic means. Both the interface logic means, radar detector means, and stereo amplifier, communicate with at least one of the vehicle's speakers and a small built in speaker located on the control panel, which is capable of producing audible alerts, and Light Emitting Diodes (LEDs) or a Liquid Crystal Display (LCD) located on the control panel which are capable of providing a visual warning when police radar signals are detected.

A key feature of the Car Stereo with Driver Warning System is that the stereo sound is immediately and automatically muted when police radar signals are detected. Another key element is that it provides for at least one jack input on the housing to receive the auxiliary antenna jack. The auxiliary antenna preferably mounts on the vehicle's grille with adhesive or other bonding means. A standard jack input is also provided on the housing, which receives the vehicle's antenna wire.

When police radar signals are detected, the stereo volume is automatically muted and an audible alarm is emitted, at a preset volume, from the vehicle's speakers. A small built-in speaker is provided on the control panel, which can also emit an audible warning if activated. The built-in speaker, and the vehicle's speakers, can be used in conjunction with each other, or independently, to produce the audible alert. LEDs or a LCD on the control panel also provide the driver with a visual alert when police radar is detected. The visual alert means can be used in conjunction with, or independently of the audible alert means.

The radar detector portion communicates with the vehicle's radio antenna and auxiliary antenna located on the vehicle's grille, greatly improving its reception capabilities. The auxiliary antenna is installed through an opening in the vehicle's firewall, and mounted on or near the vehicle's grille with adhesive or other bonding means.

The driver can operate the stereo in combination with, or independently of, the radar portion. Consequently, the driver can choose to only operate the stereo portion while the radar detector portion is deactivated. The driver can also choose to only operate the radar detector portion without utilizing the stereo portion.

Accordingly, a radar detector integrated into a typical car stereo system provides the driver with both stereo and radar detection capability, without the many disadvantages of having an independent radar detector.

Therefore, it is an objective of the present invention to eliminate the need to install/uninstall a radar detector prior to and after each trip.

Another object of the present invention is to make its radar detector portion much less obvious than a separate, conventional radar detector to reduce the potential for theft and vandalism, and eliminate the power cord which is a visual distraction.

Another object is to utilize the vehicle's antenna to increase its radar detection capabilities.

Still another object is to provide for auxiliary antenna to increase its radar detection capabilities.

The system's ability to override and automatically mute the stereo amplifier system, and the ability to use the stereo portion or radar detector portion independently, enables each driver to regulate the system as desired. This flexibility is an object of the present invention.

Radar emitters are usually installed at road construction sites to warn drivers of roadwork. Therefore, another object of the present invention is to increase driver awareness and safety.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

While the invention is particularly pointed out and distinctly claimed in the concluding portions herein, a preferred embodiment is set forth in the following detailed description which may be best understood when read in connection with the accompanying drawings, in which:

Fig 1 shows a schematic block diagram of the invention.

Fig 2 shows a preferred embodiment of the front panel of the invention.

Fig 3 shows a preferred embodiment of the auxiliary antenna.

Fig 4 shows the invention mounted in the dashboard of a typical automobile.

Fig 5 shows a rear isometric view of the invention.

Fig 6 shows an isometric view of a typical vehicle with auxiliary antenna installed.

DETAILED DESCRIPTION OF THE INVENTION

Fig 1 shows a block diagram of the present invention. The present invention is comprised of a housing 1, speaker wires 2, constant power connection 3, accessory power connection 6, and ground connection 8. The present invention is also comprised of a stereo amplifier 11 which consist of at least an AM/FM tuner, Compact Disc, tape player, and associated control panel 10. A radio antenna jack 15 that receives the vehicle's antenna wire is also provided. This configuration is similar to that of modern, conventional car stereo systems.

The control panel of the present invention is shown in Fig 2. The control panel 10 is comprised of buttons, knobs, and selectors, which allows the operator to control the stereo amplifier, such as the power (on/off), volume 31, AM/FM selector 19, channel indicator 18, radio present selector buttons 29, balance and fade 21, tuner 17, tone (bass and treble) 20, and the like. It provides for an audiotape or compact disc player 28 and associated controls, such as fast forward and reverse eject buttons 22. This basic control panel configuration is also similar to that of many conventional car stereo systems.

However, the present invention concerns the addition of a feature to the typical car stereo system that is capable of alerting the vehicle's operator when police radar is detected. This is primarily accomplished by incorporating a radar detector means 12 in the stereo housing and providing for interface and logic means 13, which interfaces with the other circuits and at least one of the vehicle's speakers 47.

Summarized briefly, police radar involves transmitting microwave signals at a target and receiving them back at the transmitter. The speed at which the signal returns relative to the speed at which it was transmitted determines the object's speed. This process is known as the Doppler effect. Police radar is transmitted on three frequencies: X band is 10.525 GHz, K band is 24.150 GHz, and Ka band is 34.360 GHz. Some states also use lasers to determine a vehicle's highway speed. Transmissions at those frequencies will pass through certain kinds of materials that are substantially transparent to them, such

as glass and most plastics, but not other kinds of materials, such as metal. In general, microwave frequencies at those frequencies travel in a straight line and must have an unrestricted exposure to the antenna in order for the radar detector to function properly.

It is these characteristics that are particularly taken advantage of by the present invention. In the present invention, police radar transmissions are received by the radio antenna 51, which are provided on the typical vehicle 50. This configuration is shown in Fig 6. This configuration vastly improves police radar reception capability. Furthermore, an auxiliary antenna is also provided. The auxiliary antenna is shown in Fig 3. The antenna 35 is mounted on the vehicle's grille 52 with adhesive or other suitable bonding means and is small enough to be virtually unnoticeable. An antenna wire 33 comprised of a prong 32 and protective sleeve 34 is installed through the vehicle's firewall, and is received by the antenna jack 14 located in the housing. Therefore, providing for a grille mounted auxiliary antenna in conjunction with utilizing the vehicle's radio antenna to receive microwave transmissions maximizes the probability that a police radar signal of interest will be received. The rear isometric view is shown in Fig 5.

Another key element to the present invention is the manner in which it alerts the driver to the presence of police radar. When the vehicle's radio antenna or the auxiliary antenna receives a police radar transmission, the signal is transmitted to the radar detector portion. The radar detector portion has circuitry similar to that of modern police radar detectors. The circuitry has bandwidths set to the frequencies of interest. If a signal is within the acceptable target range and bandwidth of the true frequency and is encountered at acceptable amplitude, then the radar detector determines that a valid police microwave transmission has been encountered. The radar detector portion then immediately communicates with the interface logic means. The interface logic means then communicates with, and instructs the stereo amplifier portion to immediately alert the driver by implementing conditions that were pre-set by the driver.

The Car Stereo with Driver Warning System can be operated in three primary modes. First, the radar detector portion can be activated while the stereo portion is

deactivated, second, the stereo portion can be activated while the radar detector portion is deactivated, and third, the radar detector portion and stereo portion can be operated simultaneously.

As noted above, the driver may elect to operate the radar detector portion while the stereo portion is tuned off. In this mode, the operation of the radar detector is similar to that of a conventional radar detector, but with improved reception capabilities. The driver selects this mode by turning the stereo portion off with the associated power and volume control 31. The driver must also activate the radar detector by selecting the associated radar power and volume control 30.

The radar detector button adjusts the volume of the audible alert that emanates from the vehicle's speakers when police radar is detected. In the event the driver prefers not to utilize the vehicle's speakers, the Car Stereo with Driver Warning System provides a built-in speaker 9. Selecting the speaker control 16 on the control panel activates this speaker. Deselecting the radar audio control 24 prevents the vehicle's speakers from emitting an alert when police radar is encountered. The speaker button also adjusts the built-in speaker volume; continually holding the button in increases the alert sound. When the desired volume is reached, the button is released. This volume setting is retained until the driver makes an adjustment. The built-in speaker has a maximum volume; holding in the speaker button will escalate the volume to its maximum level, but the volume will then gradually decline. This high low cycle is repeatable.

Also in this mode, the driver may also activate the visual alert portion located on the control panel by selecting the visual on/off control 23. These visual alerts are comprised of LEDs or LCDs and illuminate when police radar is encountered. These visual alerts display the band type that was transmitted on the band indicator 26, and display its relative signal strength on the strength indicator 25. The visual alert portion may be operated in conjunction with the audio alert, or independent of the audio alert.

Another operating mode consists of utilizing the stereo portion while the radar detector portion is deactivated. This can be accomplished by activating the stereo portion

by selecting the appropriate stereo power and volume control 31, while deactivating the radar power volume control 30. The present invention operates as a conventional car stereo in this configuration.

The third mode, and most common mode of operation, is to operate the radar detector portion and stereo portion simultaneously. This mode provides the driver with both conventional car audio sound, and police radar detection capability.

In this mode, the driver selects the radar power and volume control 30 and stereo power and volume control 31. When police radar is detected, the stereo volume momentarily mutes, and an audible warning is sent to the vehicle's speakers 47. The driver may also elect to have the audible warning sent to the built-in speaker located on the control panel, or the driver may elect to have the audible warning sent to only the built-in speaker, depending on preference. In any case, the stereo resumes its normal play after the momentary audible alert is heard. In this mode, the driver may also activate the visual alert portion, or only have the visual alert portion activated, depending on preference.

As mentioned above, an auxiliary antenna shown in Fig 3 is also provided. The auxiliary antenna 35 is mounted on the vehicle's grille.

The auxiliary antenna wire 33 is inserted through the vehicle's firewall, and the prong 32 is inserted the auxiliary antenna jack 14. A typical protective sleeve 34 made of high strength and heat resistant material is provided to eliminate potential damage to the antenna wire. The auxiliary antenna should be used if the vehicle's radio antenna is located in the rear of the vehicle. A rear located antenna does not provide for optimal radar signal detection, as the vehicle's roof could block the signal. Of course the auxiliary antenna must also be used if the vehicle does not have its own radio antenna. The auxiliary antenna can be used as the primary antenna, or in conjunction with the vehicle's radio antenna for exceptional radar detection capability.

Many security systems, garage door openers, etc. can produce false alerts. Consequently, a means to eliminate unwanted audio alerts is provided. When the false signal selector 27 is selected, pre-set signal amplitude must be reached before the alert activates. If the driver chooses not to utilize the radar detector portion, then it can be easily turned-off by making the appropriate selection on the power and volume button 30. Likewise, the radar detector portion can be activated without listening to the stereo.

When the radar detector portion is activated, it can perform a self-test. This entails an internal operational check accompanied by a momentary illumination of the LEDs and a brief audio alert.

The Car Stereo with Driver Warning System is ultimately mounted into, or under the vehicle's dashboard 41, which makes its use very convenient for the driver. Fig 5 shows the in-dash configuration. A steering wheel 40, air vent 42, and control panel 43, brake pedal 44, accelerator pedal 45 and dashboard indicator panel 46 are shown for reference.

Although preferred embodiments of the invention have been described in the foregoing Detailed Description of the Invention, it will be understood that the invention is not limited to the embodiments disclosed, but is capable of numerous rearrangements, modifications, and substitution of parts and elements without departing from the spirit of the invention. For example, the stereo portion may include at least a tape or compact disc player. The Car Stereo with Driver Warning System can be of the in-dash or under-dash variety. Certain bands can be eliminated, such as the laser and X bands. Each band can produce a separate audio alert, such as a chirp, ring, or shrill sound. The stereo could have MP3 capabilities. The switches and buttons may be placed in different positions, or eliminated without affecting the purpose of the assembly and the invention. An anti-theft detachable control face may also be provided. Accordingly, the present invention is intended to encompass such rearrangements, modifications, and substitutions of parts and elements as fall within the scope and spirit of the claims.